

Solarize Frederick County

Solar Water Heating
Solarize 201



Rick Peters
Solar Energy Services, Inc.



Agenda

- **Solar Energy Services (SES) – Who we are**
- **Solar Water Heating – how it works**
- **SWH History – Mature technology**
- **Site Requirements – install photos**
- **SWH vs. PV – applications, economics**
- **Discussion, Q&A**



Solar Energy Services, Inc

- **Maryland based with Mid Atlantic Focus**
- **Partners Maryland natives**
- **Founder has 35 Years of Solar Experience**
- **21 Employees**
- **Installer/Designer /Servicer of Solar
SPH, SWH, SSH, PV for:**
 - **Residential**
 - **Commercial**
 - **Institutional**
- **Distributor of Solar Thermal Products**
- **Lead with Solar Water Heating**
- **Residential and Commercial**



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Our Industry Advocacy

- MDV-SEIA
 - Active for 8 years
 - Board member (2011 to present)
 - President of MDV-SEIA (2013 to present)
- 2011 Succeeded in passing SWH legislation in MD
- SWH Evangelists
- Actively service SWH systems throughout region – many installed by others



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Why Consider Solar Water Heating?

- **Mature Technology**
- **Durable and Low Maintenance**
- **Low Hanging Fruit**
- **40-60% Efficient**
- **16% of US Solar Market and growing**
- **Used extensively throughout the world**

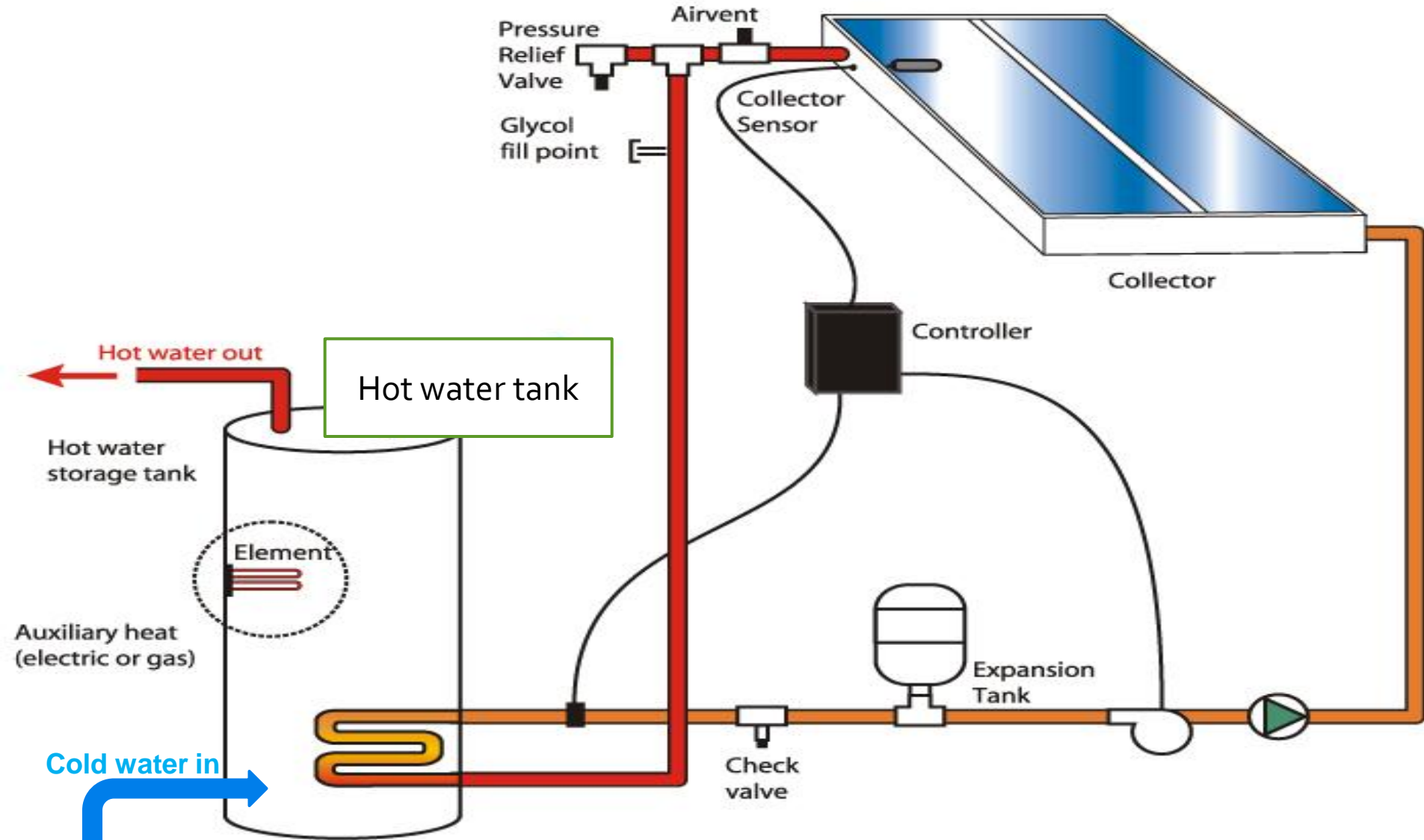


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Closed Loop, Freeze-Protection System



Dual Tank System – Natural Gas



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Single Tank System - Typical



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Solar Single-Coil Tanks

Heat Trap Specially designed built-in hot water outlet pipe preventing unnecessary heat loss.

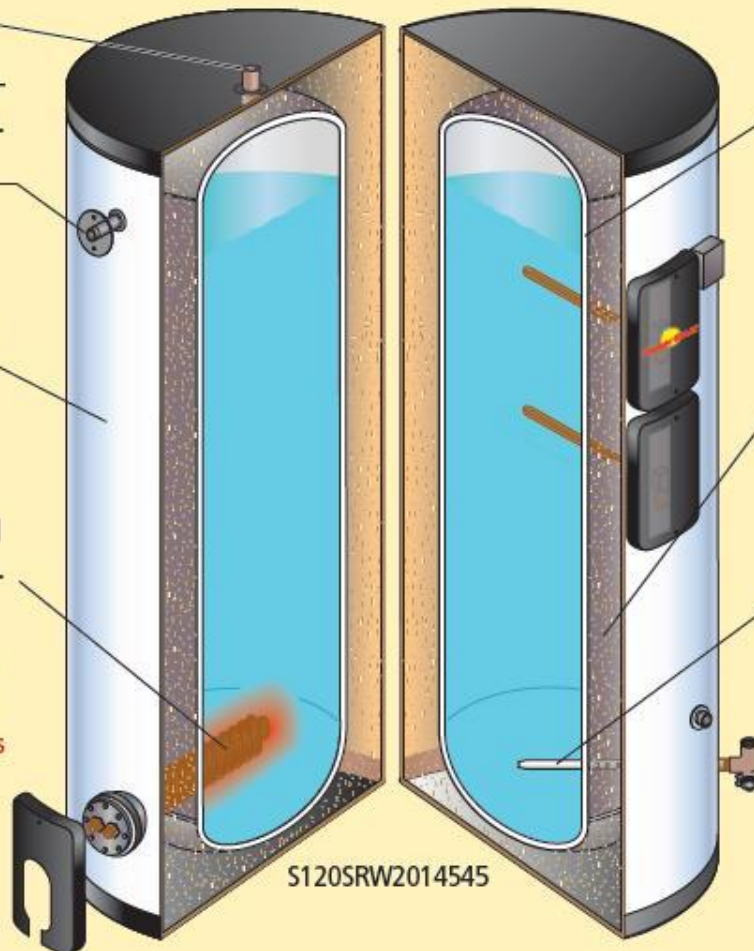
Temperature and Pressure Relief Valve (included)

Plastic Jacket Rust-free, all plastic outer jacket. Easy to clean and no maintenance.

Removable Heat Exchanger Single or dual coil for easy maintenance.

Bronze Fittings at all water openings eliminates corrosion due to dissimilar metals. No dielectric unions or anode rod required.

7 Year Limited Warranty



Hydrastone Lining

A seamless 1/2" thick lining which has proven to be the most effective method of preventing tank failure due to corrosion.

Dense Urethane Foam Insulation

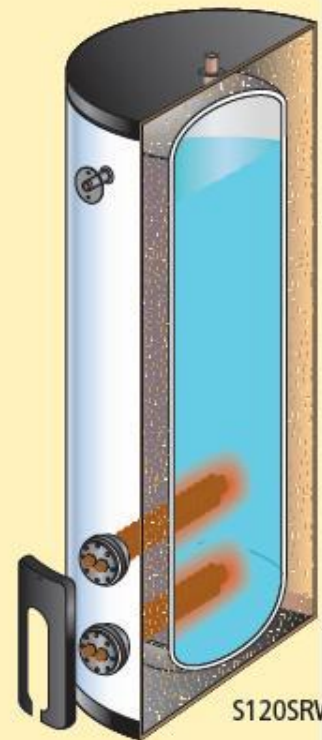
completely surrounds the tank to significantly reduce heat loss and increase energy savings.

Cold Water Inlet Diffuser

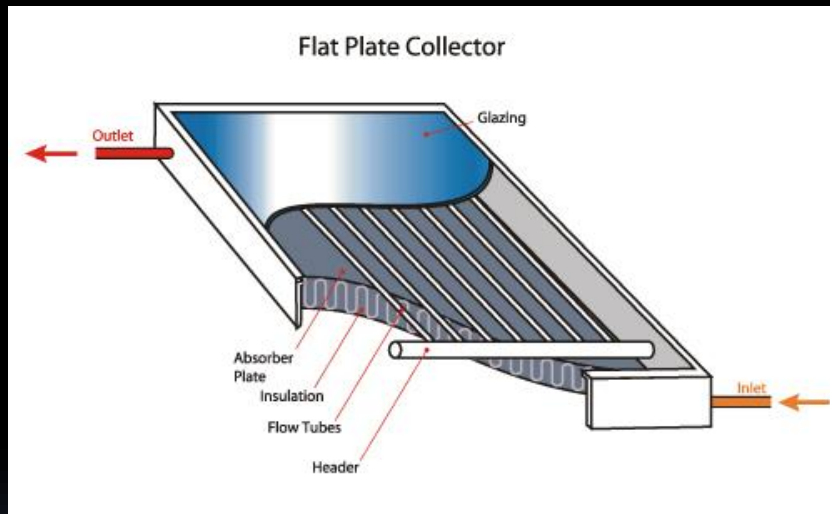
introduces cold water at the bottom of the tank and prevents turbulent mixing with heated water. This ensures desired layering of hot water through the tank.

Approved with many collectors to obtain OG300 certification.

Solar Dual-Coil

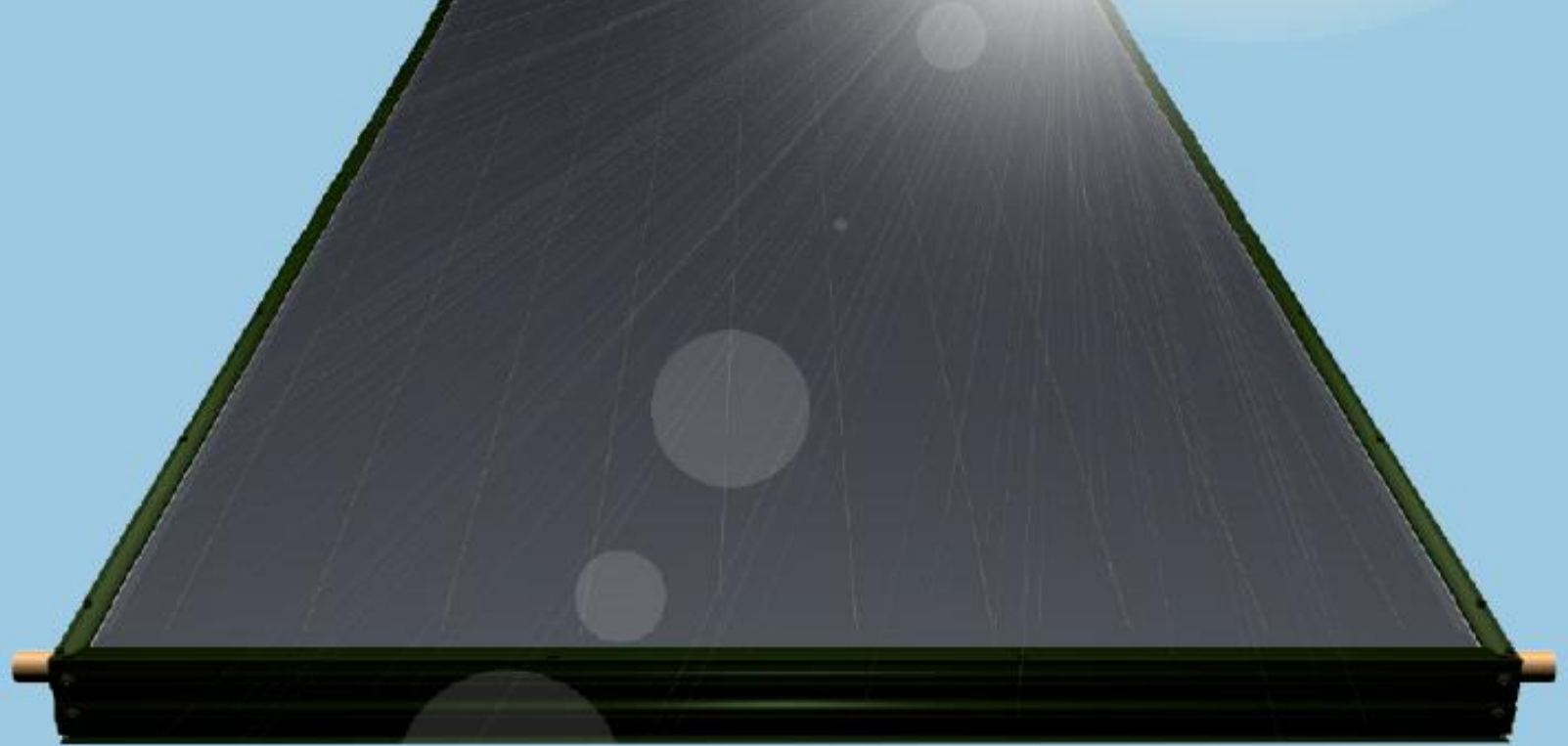


Flat Plate Collectors



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EagleSun™ collectors are designed to meet the needs of any system from 30 to 50,000 gallons with hot water, space heating, air conditioning and industrial process heat. Featuring **Thermafin™** absorbers, **EagleSun™** collectors are factory assembled from the finest materials and with the highest standards of craftsmanship. “Quick-Lock” mounting hardware makes installation easy, and the attractive design is an asset to any building. **EagleSun™** collectors are designed to provide at least 30 years of dependable service with proper maintenance, and are fully warrantied for ten years.

Origins and History of SWH

- Advances in So Europe/ N. Africa/and SE US in late 1700s
- First patent on residential water heater : Baltimore – 1891
- 1900: 30% of households in Pasadena, CA had SWH
- Boom and bust multiple times since then – displaced by cheap energy
- Used extensively throughout the world:

2008 – 70% of systems were in China
17% of systems in Europe
< ½ % in USA

- Required on new construction in Hawaii, Israel, Spain, US Gov't, etc.

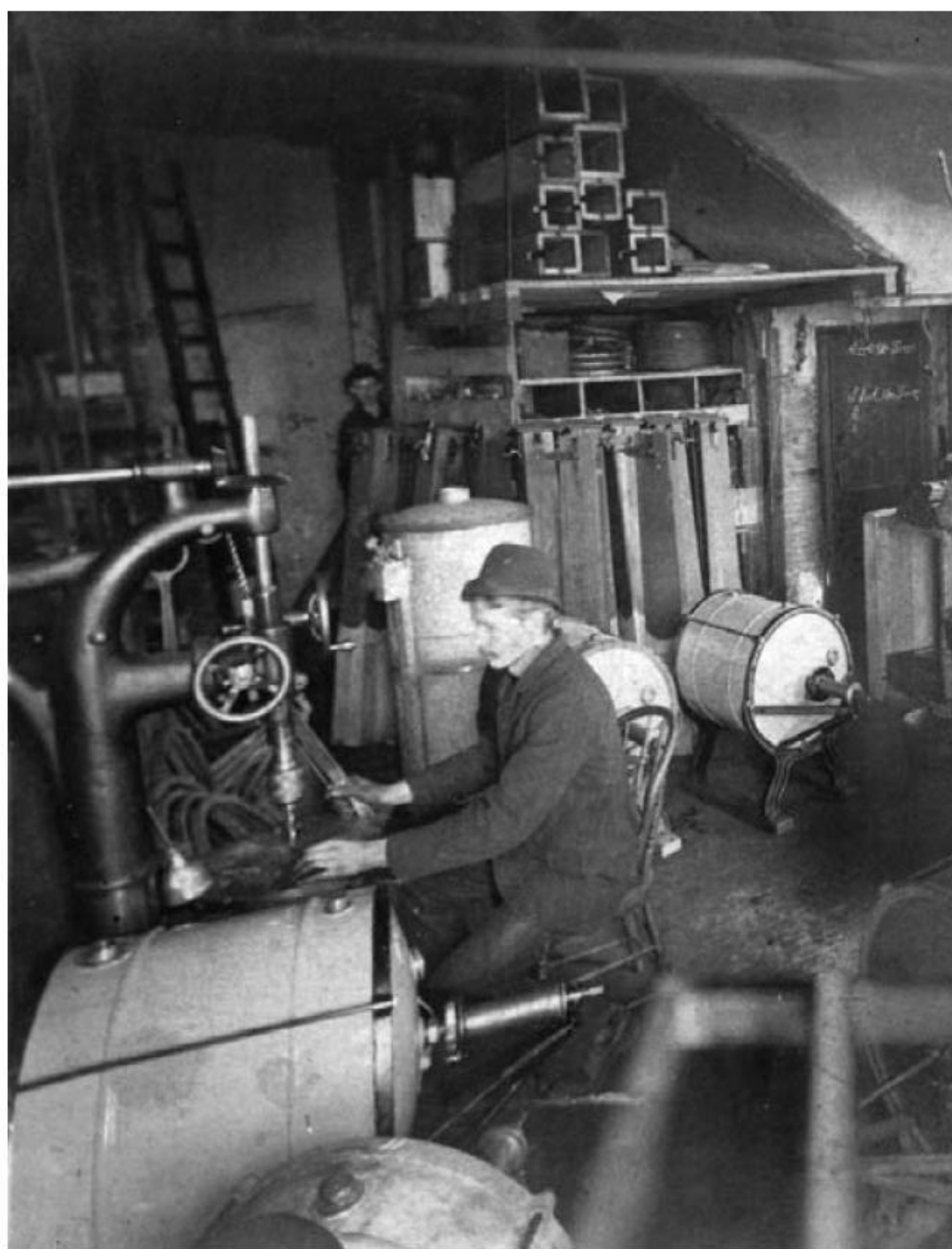


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Right: Interior view of Kemp's factory in Baltimore, Maryland.

Below: Clarence M. Kemp, inventor of the Climax solar water heater, patented in 1891.



Solar Water Heating Applications

- **Residential**

- Multifamily Housing
- Hotels
- Dormitories/Barracks
- Gymnasiums/Schools
- Restaurants/Dining Halls
- Carwashes
- Laundromats
- Processing Industries
- Health Clubs



Residential SHW Requirements

- Roof Space with 4-5 hours of sun
- Preferably South, but E or W too
- Hot water demand – 3 person residential
- Space Heating evaluated case by case
- Nice Combo is SH, SHW and Pool
- Electric, Oil, Propane best paybacks
- Natural gas – need more occupants



Household Members	Electric	Oil*	Propane	Natural Gas
2	Consider	Consider	Consider	No
3	Consider	Yes	Consider	No
4	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Consider
6	Yes	Yes	Yes	Consider
>6	Yes	Yes	Yes	Yes

*If boiler runs in summer time for hot water, this is a great solar water heating application

Residential Project Photos



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Maryland Governor's Mansion

Pricing Tiers

Increasing Discounts

Solarize Frederick County - Solar Thermal Pricing				
	System Size (people served)	Retail Cost	Solarize Cost	% Discount from Retail
Tier 1: Up to 10 Systems of Any Size	1-2 person	\$8,725	\$7,725	11.5%
	2-3 person	\$9,446	\$8,446	10.6%
	3-4 person	\$9,625	\$8,625	10.4%
	5+ person	\$10,064	\$9,064	9.9%
Tier 2: 11-29 Systems of Any Size	1-2 person	\$8,725	\$7,416	15.0%
	2-3 person	\$9,446	\$8,137	13.9%
	3-4 person	\$9,625	\$8,343	13.3%
	5+ person	\$10,064	\$8,755	13.0%
Tier 3: 30+ Systems of Any Size	1-2 person	\$8,725	\$7,004	19.7%
	2-3 person	\$9,446	\$7,725	18.2%
	3-4 person	\$9,625	\$8,034	16.5%
	5+ person	\$10,064	\$8,343	17.1%



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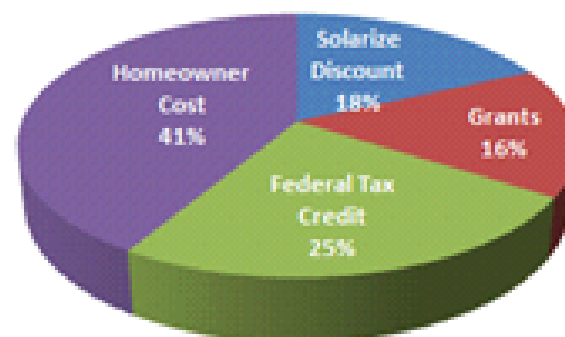
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Solar Thermal Purchase - Financials

Great Case Scenario

Cost Analysis Flat Plate Collectors	Sized for 2-3 people
Installed Retail Cost	\$9,446
Solarize Discount (18.2%)	-\$1,721
Solarize Grant (Certified PS)	-\$1,000
MD State Grant	-\$500
Federal Tax Credit	-\$2,318
Electricity Savings in YR 1	-\$417
SREC sale (1 SREC = \$140) 5 max per year	-\$560
Total Grants/Credits/Savings YR 1	-\$6,515
Net Cost to System Owner YR 1	\$2,931
Years 2-5 Electricity Savings	-\$1,667
SREC 5-Yr average	-\$2,800
Net Cost to System Owner (YR5)	-\$1,536

Breakdown of First Year Costs
(not including electricity saving or SREC Sales)



3 Sample Systems

Tier 3 Pricing Example

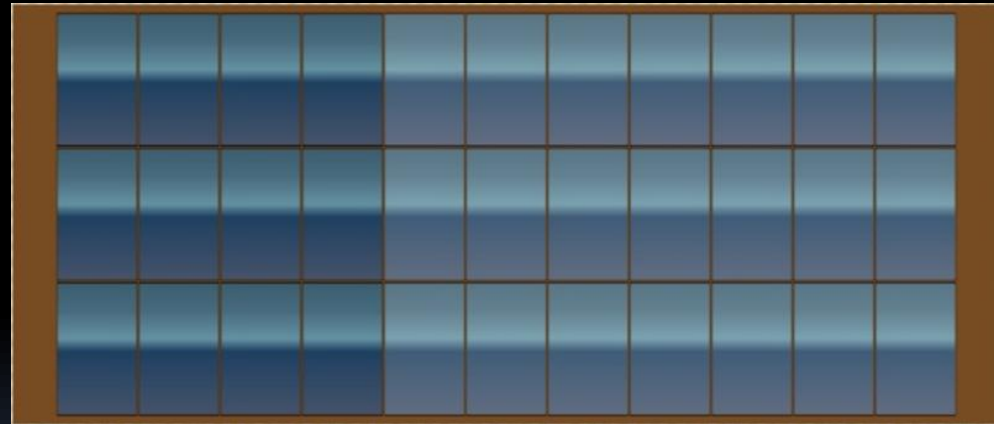
(See Handout)

8.25 kW PV only 33 panels (entire roof covered)

Annual Savings:
\$1281

Simple Payback (excluding SRECs):
13.9 years

Net Out of Pocket (excluding SRECs):
\$17,751



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5.25 kW: 4 people (21 panels + SHW)

Annual Savings:

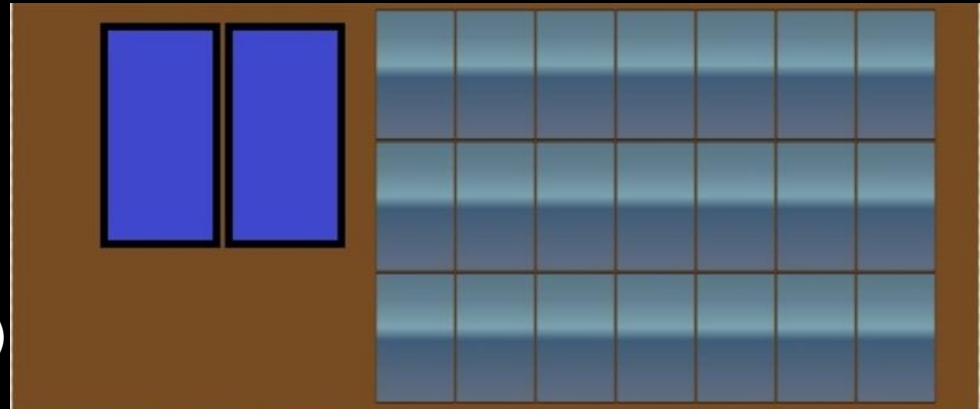
\$1305

Simple Payback (excluding SRECs):

11.3 years

Net Out of Pocket (excluding SRECs)

\$14720



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6.75 kW: 4 people, roof covered (27 panels + SHW)

Annual Savings:

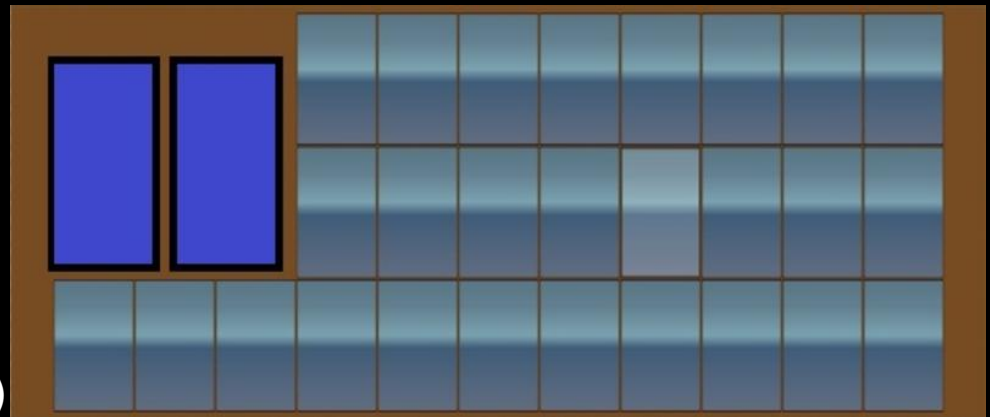
\$1545

Simple Payback (excluding SRECs):

11.9 years

Net Out of Pocket (excluding SRECs)

\$18,448



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Summary of Economics

3 Sample Systems

	8.25 kW	5.25 kW + Hot Water	6.75kW + Hot Water
Annual Energy Savings	\$1281	\$1305	\$1545
Simple Payback (excluding SRECs)	13.9 years	11.3 years	11.9 years
Net out of Pocket (excluding SRECs)	\$17,751	\$14,720	\$18,448



Thank You

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www.solarsaves.net



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